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THOMPSON HINE L.L.P.  
2000 COURTHOUSE PLAZA , N.E.  
10 WEST SECOND STREET  
DAYTON, OH 45402

EXAMINER

BRINEY III, WALTER F

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 03/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/921,043

Applicant(s)

MITCHELL, BRIAN

Examiner

Walter F Briney III

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>14 January 2002</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. **Claims 1-4, 6-19, and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goosens (US Patent 4,517,416) in view of Petroff et al. (US Patent Application Publication 2002/0176597).**

**Claim 1** is limited to a *low frequency loudspeaker*. Goosens discloses an electro-acoustic transducer having a diaphragm comprising a layer of polymethacrylimide foam. See Abstract. With respect to the structure of the speaker, Goosens depicts in figure 3, a *driver* (2) that is coupled to cone diaphragm (21). The voice coil/*driver* is coupled to a spider/*inner suspension* (5) and a surround/*outer suspension* (7). Cone (21) drives a *further diaphragm* (20) that is *flat*. One edge of the *further diaphragm* (20) is terminated at *outer suspension* (7). Clearly, Goosens does not depict a *second edge that defines an aperture for passage of acoustic energy directly from said cone (21) laterally outwardly of said cone*.

Petroff teaches a flat panel speaker, similar to that disclosed by Goosens in that a substantially flat diaphragm is resonated by a secondary cone-shaped diaphragm. In particular, figure 7 of Petroff depicts a *driver* (16) that corresponds to the voice coil (2) of Goosens, a secondary cone (24) that corresponds to cone (21) of Goosens, and a flat

diaphragm (18) that corresponds to the diaphragm (20) of Goosens. The operating principles are quite similar, however, the flat diaphragm (18) of Petroff includes a secondary edge (44) that defines aperture (42). This aperture allows sound to pass directly from cone (24). Petroff indicates that this aperture increases the frequency response of the speaker. See paragraph 44. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify a flat diaphragm to include a hole coincident with the location of a secondary cone diaphragm as taught by Petroff for the purpose of enabling greater sound reproduction within the middle to high ranges.

**Claim 2** is limited to *a loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. As seen in figure 3, the *further diaphragm* (20) is mechanically terminated and secured to the speaker chassis (6) by centering ring (7). The centering ring provides a *secondary suspension*, which also means it provides an inherently rigid termination, as it must provide a restorative force to the lateral displacement of driver (2), cone (21) and diaphragm (20). Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 3** is limited to *a loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. Clearly, the termination of the *further diaphragm* (20) at centering ring (7) must be inherently resilient, otherwise the diaphragm would fly free of the speaker chassis (6) upon lateral displacement imposed by driver (2). Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 4** is limited to *a loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. It is clear from figure 3 that *cone diaphragm* (21) and *flat*

*diaphragm* (20) are connected together by way of annular device (30). Their connection must inherently be rigid, so cone (21) can induce mechanical vibrations within *diaphragm* (20). Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 6** is limited to *a loudspeaker as claimed in claim 4*, as covered by Goosens in view of Petroff. As shown in the rejection of claim 4, Goosens depicts an annular *intermediate member* (30) that provides elastic dampening, making it inherently *rigid*. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 7** is limited to *a loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. Clearly, figure 3 of Goosens depicts a *resilient connection* between *flat diaphragm* (20) and *cone* (21), as no displacement is allowed between the *flat diaphragm* and *cone*. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 8** is limited to *a loudspeaker as claimed in claim 7*, as covered by Goosens in view of Petroff. As shown in the rejection of claim 4, *cone* (21) is connected to the *flat diaphragm* (20) by way of *intermediate member* (30), which provides elastic dampening, making it inherently *resilient*. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 9** is limited to *a loudspeaker as claimed in claim 6*, as covered by Goosens in view of Petroff. Figure 4 depicts a perspective view of the speaker of figure 3, it is clear that each element is of a substantially annular construction, including

*intermediate member* (30). Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 10** is limited to a *loudspeaker as claimed in claim 8*, as covered by Goosens in view of Petroff. Figure 4 depicts a perspective view of the speaker of figure 3, it is clear that each element is of a substantially annular construction, including *intermediate member* (30). See column 7, lines 24-25. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 11** is limited to a *loudspeaker as claimed in claim 10*, as covered by Goosens in view of Petroff. Goosens discloses that the *intermediate member* (30) is possibly made out of rubber, which in itself is not a *cellular material*.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to use cellular rubber instead of normal rubber in order to provide elastic dampening between a first conical diaphragm and a second substantially flat diaphragm. Applicant has not disclosed that using a cellular material provides any advantage, is used for a particular purpose, or solves a state problem. One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well with either a cellular or plain rubber elastic insulating tubing because the elasticity and resistive force provided by either is a mere design choice, both devices being capable of providing substantially the same physical constants. Therefore, it would have been obvious to a person of ordinary skill in the art to use cellular rubber instead of plain rubber as specified in claim 11.

**Claim 12** is limited to a *loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. As taught by Petroff, the *second edge (44)* is preferably the same size as cone (24) (cone 21 of Goosens). The cone and flat diaphragms are then connected at this point, *adjacent* to each other. See paragraph 44. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 13** is limited to a *loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. As seen in figure 3 of Goosens, the *cone (21)* is connected to *outer suspension (7)* by way of or *adjacent* to *flat diaphragm (20)*. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 14** is limited to a *loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. As seen in figure 3, *inner suspension (5)* is connected to the *inner edge of cone (21)* while the *outer suspension (7)* is connected to the *outer edge of cone (21)*. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 15** is limited to a *loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. Goosens discloses that the *flat diaphragm (20)* comprises a first, second, and third layers (i.e. *laminar*). See column 5, line 43 through column 6, line 40. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 16** is limited to a *loudspeaker as claimed in claim 15*, as covered by Goosens in view of Petroff. Goosens discloses a top (10) and bottom skin layer (11), or *first and second layers*. See column 5, lines 48-51. The two layers sandwich a layer of

foam formed with corrugations, as seen in figure 4. See column 7, lines 34-39.

Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 17** is limited to a *loudspeaker as claimed in claim 15*, as covered by Goosens in view of Petroff. Goosens discloses that the laminar is composed of polymethacrylimide foam (i.e. *plastics material*). See column 7, lines 34-39. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 18** is limited to a *loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. As seen in figure 3, the *lateral dimension* of the *flat diaphragm* (20) is anywhere between one and two times as great as the *lateral dimension* of the *cone diaphragm* (21). Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 19** is limited to a *loudspeaker as claimed in claim 18*, as covered by Goosens in view of Petroff. As seen in figure 3, the *lateral dimension* of the *flat diaphragm* (20) is less than *three times* that of the *lateral dimension* of the *cone diaphragm* (21). Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 21** is limited to a *loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. Goosens discloses driving the voice coil (2) with a magnetic structure (4) (i.e. *an electromagnetic motor*). See column 5, lines 27-38. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 22** is limited to a *loudspeaker as claimed in claim 22*, as covered by Goosens in view of Petroff. As seen in figure 3, the *chassis* (6) defines a *frustoconical*



*volume*. Therefore, Goosens in view of Petroff makes obvious all limitations of the claim.

**Claim 23** is limited to *a low frequency loudspeaker*. Claim 23 essentially contains all the limitations of claim 1, and in addition those recited in claims 15, 18, 19, and 21, all of which are unpatentable over Goosens in view of Petroff.

2. **Claims 1, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goosens et al. (US Patent 4,567,327) in view of Petroff.**

**Claim 1** is limited to *a low frequency loudspeaker*. Goosens '327 discloses a flat diaphragm transducer. See Abstract. With respect to the structure of the speaker, Goosens '327 depicts in figure 2, a *driver* (2) that is coupled to cone diaphragm (21). The voice coil/*driver* is coupled to a spider/*inner suspension* (5) and a surround/*outer suspension* (7). Cone (21) drives a *further diaphragm* (1) that is *flat*. One edge of the *further diaphragm* (1) is terminated at *outer suspension* (7). Clearly, Goosens '327 does not depict *a second edge that defines an aperture for passage of acoustic energy directly from said cone (21) laterally outwardly of said cone*.

Petroff teaches a flat panel speaker, similar to that disclosed by Goosens '327 in that a substantially flat diaphragm is resonated by a secondary cone-shaped diaphragm. In particular, figure 7 of Petroff depicts a *driver* (16) that corresponds to the voice coil (2) of Goosens '327, a secondary cone (24) that corresponds to cone (21) of Goosens '327, and a flat diaphragm (18) that corresponds to the diaphragm (1) of Goosens '327. The operating principles are quite similar, however, the flat diaphragm (18) of Petroff includes a secondary edge (44) that defines aperture (42). This aperture

allows sound to pass directly from cone (24). Petroff indicates that this aperture increases the frequency response of the speaker. See paragraph 44. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify a flat diaphragm to include a hole coincident with the location of a secondary cone diaphragm as taught by Petroff for the purpose of enabling greater sound reproduction within the middle to high ranges.

**Claim 4** is limited to *a loudspeaker as claimed in claim 1*, as covered by Goosens '327 in view of Petroff. It is clear from figure 2 that *cone diaphragm* (21) and *flat diaphragm* (1) are directly connected together. Their connection must inherently be rigid, so cone (21) can induce mechanical vibrations within diaphragm (1). Therefore, Goosens '327 in view of Petroff makes obvious all limitations of the claim.

**Claim 5** is limited to *a loudspeaker as claimed in claim 4*, as covered by Goosens '327 in view of Petroff. As shown in the rejection of claim 4, the secondary cone diaphragm (21) directly induces mechanical vibrations within flat diaphragm (1) with no intervening coupling. Therefore, Goosens '327 in view of Petroff makes obvious all limitations of the claim.

3. **Claim 20** is rejected under 35 U.S.C. 103(a) as being unpatentable over Goosens in view of Petroff and further in view of Azima (US Patent Application Publication 2001/0055402).

**Claim 20** is limited to *a loudspeaker as claimed in claim 1*, as covered by Goosens in view of Petroff. Goosens discloses that the *flat diaphragm* (20) may be of rectangular shape. Clearly, the *outer suspension* (7) will be inherently required to take a rectangular shape as well to fit the shape of the diaphragm. However, Goosens does

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not disclose the shape of the *corners* of the *outer suspension*, and hence terminating *frame* of the *flat diaphragm* (20).

While not depicting an *outer suspension*, Azima teaches a flat loudspeaker, such as that disclosed by Goosens that is terminated by a square frame with rounded corners on both the inside and outside. It would have been obvious to one of ordinary skill in the art to terminate a rectangular, flat diaphragm as taught by Azima because Goosens does not pictographically disclose how one of ordinary skill in the art would shape the terminating frame of the rectangular, flat diaphragm.



**SINH TRAN**  
**SUPERVISORY PATENT EXAMINER**